

PLATE XX.

Fig. 1. *Dinilysia patagonica* (pp. 176-179); imperfect skull and mandible, upper and left lateral (1a) aspects, with oral aspect of right maxilla (1b) and fractured quadrate bone (1c), nat. size.—From Red Sandstone, Neuquen. *ag.*, angular; *d.*, dentary; *ec.*, ectopterygoid; *ex.occ.*, exoccipital; *fr.*, frontal; *mx.*, maxilla; *na.*, nasal; *nar.*, external narial opening; *o.*, projecting otic bone; *op.*, opisthotic; *orb.*, orbit; *pa.*, parietal; *pr.f.*, prefrontal; *pr.o.*, pro-otic; *pt.*, pterygoid; *pt.f.*, postfrontal; *qu.*, quadrate; *r.*, lateral ridge on parietal; *s.occ.*, supraoccipital; *s.t.*, supratemporal; *x.*, fracture.

2. Ditto; portion of vertebral column of same specimen, nat. size. *n.*, neural spine; *r.*, rib.

All the original specimens are preserved in the La Plata Museum.

2. Note on the Innervation of the Supraorbital Canal in the Cat-fish (*Chimæra monstrosa*). By R. H. BURNE, B.A., F.Z.S., Anatomical Assistant in the Museum of the Royal College of Surgeons.

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(Text-figure 49.)

An excellent historical *résumé* of the work that has hitherto been done upon the comparative anatomy and more particularly the innervation of the organs of the lateral line, with a discussion of the morphological conclusions that may be drawn from them, is to be found in two recent papers by Cole¹, so that for the purposes of this note it will be amply sufficient to briefly sketch certain ascertainment facts with regard to the innervation of this sensory system. It has now been shown in several instances that the nerves that supply the lateral-line organs have no real relation to the cranial nerves in whose company they leave the brain, but arise within the brain in common with the auditory nerve from a particular centre—the tuberculum acusticum. Furthermore in almost all cases, when sufficient care is used in the examination, the lateral-line nerves are found to enter into a definite and constant relationship with certain of the cranial nerves. Thus the lateral-line nerve that supplies the supraorbital canal forms the Ramus ophthalmicus superficialis of the VIIIth cranial nerve, that for the suborbital canal constitutes the R. buccalis VII, and that for the hyomandibular canal the Ramus hyomandibularis VII; while the main lateral canal of the trunk is innervated by the lateralis branch of the vagus. Although this connection of the lateral-line nerves with the VIIth and Xth cranial nerves only is almost universal, it is not so in every case. For instance, in many

¹ Cole: "Observations on the Structure and Morphology of the Cranial Nerves and Lateral Sense-organs of Fishes," Trans. Linn. Soc. vii. 1898, p. 187; and "On the Cranial Nerves of *Chimæra monstrosa*," Trans. R. Soc. Edinb. xxxviii. 1897, p. 635.

Teleosts and one or two Elasmobranchs the nerve to the anterior organ of the main trunk-canal emerges from the brain in connection with the glossopharyngeal; and in *Chimæra* two organs in the middle of the supraorbital canal are innervated by twigs from the Ramus ophthalmicus profundus of the Vth cranial nerve—apparently the only genuine case of connection between the nerves of the lateral line and the trigeminus. This anomaly in the innervation of the supraorbital canal in *Chimæra* was discovered by Cole¹, and evidently caused him considerable perplexity, for he does his best to minimise the awkwardness of the fact and calls to his aid a suggestion thrown out by Pollard to the following effect:—"I should prefer to say that some nerve-fibres had struck the path of the profundus but did not belong to it, just as, for instance, in Siluroids the fourth nerve accompanies the profundus, though I think everyone would hesitate to say that the fourth nerve was a branch of the profundus"².

This suggestion, ingenious as it is, cannot without further evidence be said to give us much practical help. In the following note I hope to be able to give that further evidence and to show that Pollard was upon the right track, although the details of the connection between the superficialis and profundus fibres do not exactly conform to the picture that he evidently had in mind.

During the last few months I have had occasion to dissect three heads of *Chimæra monstrosa* for various purposes connected with the Museum, and in all three specimens the branch of the profundus that is said by Cole to innervate two organs of the supraorbital canal was joined after leaving the orbit by two twigs from the Ramus ophthalmicus superficialis of the facial. The figure given below (text-fig. 49, p. 186) is compounded from two of the most satisfactory dissections, in one of which the connection between the nerves, and in the other their further distribution was seen to the best advantage.

On a level with the anterior border of the interorbital membrane, the Ramus ophthalmicus profundus of the trigeminal gives off a branch as described by Cole, which runs in an antero-dorsal direction towards the forehead closely applied to the perichondrium. Shortly after leaving the orbit it divides into two subsidiary branches (A and B). The branch A, after crossing the main trunk of the superficialis VII (at this point embedded in the cartilage of the skull), again divides into two smaller twigs (C & D). The twig C continues in an almost perpendicular line towards the dorsal surface of the head and is lost in the frontal clasper in the male³, and in the female upon the skin in the corresponding position. The twig D, on the other hand, reunites at an acute

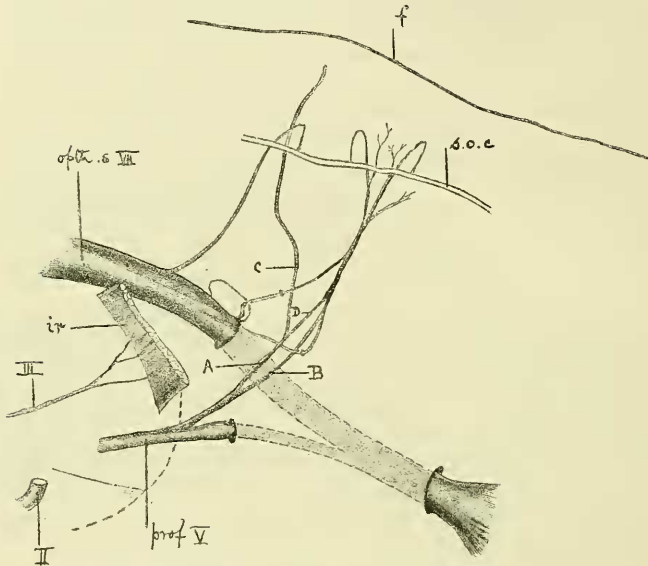
¹ Trans. R. Soc. Edinburgh, xxxviii. 1897, p. 645.

² Trans. R. Soc. Edinburgh, xxxviii. p. 638.

³ In the male specimen, I was under the impression that this nerve to the clasper was joined by a filament from the superficialis—making, in all, three connections between the superficialis and profundus, but the dissection was not sufficiently good to be quite sure upon the point.

angle with the branch B of the previous division. Just before the union of the branches D and B of the profundus, the branch B is joined by a twig from the Ramus ophthalmicus superficialis VII, which rises from the main superficialis trunk just after its entry into the preorbital cartilage, and runs forward embedded in the cartilage to a point close in front of branch B; upon leaving the cartilage at this point it turns abruptly upwards to make the above-mentioned junction with branch B of the profundus.

Text-fig. 49.



.Part of Ophthalmicus superficialis VII and profundus V of
Chimæra monstrosa.

A, B, C, D, branches of the profundus; II, III, optic and oculo-motor nerves; *f*, outline of the forehead; *i.r.*, internal rectus; *o.p.h.t.s.* VII, ophthalmicus superficialis VII; *prof.* V, ophthalmicus profundus V; *s.o.c.*, supraorbital canal.

The nerve, consisting now of fibres derived from both superficialis and profundus, continues its antero-dorsal course for a short distance, and is then joined by a second twig from the superficialis. This twig rises from the main trunk directly before its entry into the preorbital cartilage; it runs in an antero-dorsal direction buried for a short space in the skull; it emerges close behind branch C of the profundus and passes beneath that nerve without being in any way connected with it, to reinforce the compound superficialis and profundus nerve as previously stated. The compound nerve now soon divides into three branches: one of these I lost, after a short course, upon the perichondrium; each of the other two

supplied a sense-organ of the supraorbital canal and sent a few twigs to the surrounding skin.

This somewhat complicated description when compared with the figure will, I trust, make it clear that these two supraorbital sense-organs in *Chimæra* do not, as was supposed, present an anomaly in their innervation, but receive their nerves in all likelihood from the superficialis as do the other organs of that canal, and in their mode of innervation show a close similarity to those that lie in front of them; for in both cases the actual nerve-trunk from which the filaments for the individual sense-organs arise is of a compound nature formed by an intimate blending of the superficialis VII with the profundus V, differing only in the fact that in the case of these two sense-organs the union occurs between the smaller branches of the nerves, while in that of the organs in front it involves their main trunks. In both cases the fusion is so complete, that it is impossible by simple dissection to say definitely that the fibres derived from the superficialis terminate in the lateral-line sense-organs, while those of the profundus are distributed to the skin; but the probabilities that such is the case are so great as to almost amount to certainty.

3. Contributions to the Knowledge of the Structure and Systematic Arrangement of Earthworms. By FRANK E. BEDDARD, M.A., F.R.S.

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(Text-figures 50-58.)

1. On *Polytoreutus gregorianus*.

This species was very briefly defined by me five years ago in my Monograph of the *Oligochæta*¹. Since then the publication of descriptions and illustrations of various new species of the genus has decided me to attempt an addition to our knowledge of this remarkable genus by a fuller account of the form which I named after Prof. Gregory of Melbourne, and which was collected by him in Africa during his expedition of 1894.

The worm measures 230 mm. in length by a diameter of 9 mm. The number of segments are between four and five hundred². As might be supposed from their large numbers, the segments are very short; this is the case with all those lying behind the clitellum; those forming the clitellum and those lying in front of it are stout segments as in other earthworms.

The *setæ*, as in other species of *Polytoreutus*, are in couples, of which the two lateral are more closely approximated to each other than the two ventral. The disproportion of the spaces separating the two lateral *setæ* from each other and the two ventral *setæ* is

¹ Oxford, Clarendon Press, 1895, p. 612.

² These measurements differ slightly from those which I originally gave.